U.S. ENVIRONMENTAL PROTECTION AGENCY – REGION 6

Technical Support Document for EPA R6 Review of:

Louisiana Criteria Revisions: *Dissolved Oxygen Criteria Revisions for Eastern Lower Mississippi River Alluvial Plains Ecoregion (LAC 33:IX:1123) (Rule WQ091)*

Revisions adopted by Louisiana Department of Environmental Quality on December 20, 2015

U.S. EPA REGION 6
WATER QUALITY PROTECTION DIVISION
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I. Introduction

Background

As described in §303(c) of the Clean Water Act (CWA) and in the water quality standards (WQS) regulation at 40 CFR §131.20, states and authorized tribes have primary responsibility to develop and adopt WQS to protect their waters. State and tribal WQS consist of three primary components: designated uses, criteria to support those uses, and antidegradation requirements. In addition, CWA §303(c)(1) and 40 CFR §131.20 require states to hold public hearings at least once every three years to review and, as appropriate, modify and adopt standards. As specified in 40 CFR §131.21, the Environmental Protection Agency (EPA) reviews new and revised surface WQS that have been adopted by states and authorized tribes. Authority to approve or disapprove new and/or revised water quality standards submitted to EPA for review has been delegated to the Water Division Director in Region 6. State or tribal WQS are not considered effective under the CWA unless and until approved by EPA.

The purpose of this Technical Support Document (TSD) is to document the review and provide the basis for EPA's actions concerning revisions to Dissolved Oxygen Criteria for Eastern Lower Mississippi River Alluvial Plains (eLMRAP) Ecoregion (LAC 33:IX:1123) (Rule WQ091), adopted by the Louisiana Department of Environmental Quality (LDEQ) on December 20, 2015.

Chronology of Events

On December 20, 2015, the Louisiana Department of Environmental Quality (LDEQ) adopted revisions to Louisiana's surface water quality standards (WQS) at LAC 33:IX.1123, Table 3. These consisted of dissolved oxygen (DO) criteria revisions for freshwater and tidally influenced inland streams in subsegments located within the eLMRAP ecoregion, as well as boundary refinements for 42 subsegments. LDEQ refers to the rule as WQ091.

June 7, 2013	LDEQ finalized a UAA for the eLMRAP which suggested that the DO criteria established for streams in the western portion of the LMRAP in the Barataria-Terrebonne UAA are appropriate for the eastern portion as well
November 25, 2013	EPA sent letter to LDEQ noting no significant points of concern with the UAA
November 18, 2014	LDEQ sent EPA a draft version of the eLMRAP rule which included the eLMRAP DO criteria and subsegment boundary refinements
December 18, 2014	EPA provided LDEQ with comments on the draft eLMRAP rule
March 18, 2015	LDEQ provided responses to EPA's comments on the draft eLMRAP rule
June 20, 2015	LDEQ published a proposed rule for eLMRAP DO criteria and subsegment boundary refinements (WQ091)
August 25, 2015	EPA sent a letter to LDEQ noting no further comments or concerns on the proposed rule
September 4, 2015	Tulane University provided extensive comments on the proposed rule to LDEQ
November 4, 2015	LDEQ sent EPA a copy of "Comment Summary Response & Concise Statement," their response to selected comments from the public comment period.
December 20, 2015	LDEQ adopted WQ091 (eLMRAP DO) revisions
January 12 2016	EPA received LDEQ's WQS submittal for the eLMRAP rule revisions
February 24 2016	EPA facilitates call between LDEQ and Gulf Restoration Network/Tulane Environmental Law Clinic to discuss concerns and comments provided September 4 2015
March 8 2016	EPA receives letter and data from Tulane Environmental Law Clinic/Gulf Restoration Network: "Request for Disapproval of Louisiana DO Changes - WQ091"

April 26, 2016	EPA receives email response from LDEQ to inquiry seeking clarification on WQ091 data
May 10, 2016	LDEQ/EPA collaborative call to clarify details of WQ091 and establish estimated timeline for action

Summary of Revisions to WQ091

The Dissolved Oxygen Criteria Revisions for eLMRAP Ecoregion (LAC 33IX.1123)(WQ091) revised the DO criteria for 31 inland streams to 2.3 mg/L for the months of March through November; for the months of December through February the DO criteria for inland streams will remain as 5.0 mg/L (inland areas) or 4.0 mg/L (for estuarine areas). This revision was based on findings from a use attainability analysis of inland rivers and streams in the eLMRAP ecoregion. In addition, boundaries for 42 subsegments within the eastern eLMRAP, the southern plains terrace, and flatwoods, the terrace uplands, and the coastal deltaic marshes ecoregions are being refined based on watersheds; these boundary refinements resulted in the delineation of 21 new subsegments.

The DO criteria revisions were derived using an ecoregion approach and are the result of findings presented in a June 7, 2013, report entitled *Use Attainability Analysis (UAA) of Inland Rivers and Streams in the Eastern Lower Mississippi River Alluvial Plains Ecoregion for Review of Dissolved Oxygen Water Quality Criteria*. The UAA demonstrated that the DO criteria established for streams in the western portion of the LMRAP as a result of the earlier Barataria-Terrebonne UAA are also appropriate for the eastern portion of the LMRAP. EPA had no significant points of concern for the UAA, as stated in the November 25, 2013 letter to LDEQ

II. New or Revised Provisions EPA is Approving

EPA is approving DO criteria revisions for all 31 watershed subsegments, listed here: 040201, 040303, 040305, 040306, 040401, 040402, 040403, 040404, 040503, 040506, 040508, 040601, 040604, 040605, 040606, 040702, 040705, 040809, 040907, 040915, 040916, 040917, 041101, 041201, 041202, 040807, 040808, 040903, 040912, 040913, and 040914. Discussion of approval rationale is found below.

Discussion of Additional Commentary Received

Following LDEQ's WQS submittal for the eLMRAP rule revisions, EPA received additional information from Tulane Environmental Law Clinic, working with the Gulf Restoration Network (GRN). This information provided additional commentary and data, raising valid concerns for the revisions, via a letter with several enclosures dated March 8, 2016, "Request for Disapproval of LDEQ's Amendments to the Water Quality Regulations regarding Dissolved Oxygen Criteria for Water Quality Subsegments in the Eastern Lower Mississippi River Alluvial Plains Ecoregion (LAC 33:IX.1123.Table 3) (WQ091)"

The letter stated six main concerns, which EPA R6 staff investigated. The concerns and EPA's findings included the following:

1. None of the UAA reference sites are on the Northshore of Lake Pontchartrain, and thus data cannot be representative of the watershed segments in that area.
    - LDEQ is using an ecoregion-based approach, which EPA has previously agreed to in the 2008 MOA. Reference sites were chosen from least impacted water bodies that met the following criteria: without unique morphological/hydrological characteristics, with no significant point or nonpoint sources of pollution, without hydromodification, and must be accessible to the sampling crew. Reference sites are representative of the entire ecoregion.
2. Many of the Northshore subsegments, plus subsegment 040506, contain portions outside of the ecoregion.
    - Ecoregion boundaries in Louisiana change as the ecoregions are shaped by major ecological events, such as hurricanes. The most recent revisions to the ecoregion boundaries and subsegment boundaries were established via ground-truthing, to establish the direction of water flow for that watershed, and confirming that all drainage ends up in the eLMRAP ecoregion. By excluding drainage from adjacent ecoregions LDEQ ensures that any

criteria set for subsegments included within the eLMRAP ecoregion would be accurate.

3. Monitoring data shows that Northshore waterbodies are achieving 5.0 mg/l of dissolved oxygen year-round.
    - Monitoring "ambient" data for DO is not as scientifically stringent as the continuously collected monitoring data used to develop this criteria. Continuous use monitoring data allows for examination of the full DO cycle, taking into account the natural high and low points in DO that occur. In comparison, ambient data is a single "grab sample" typically taken at some point between 6 am and 12 pm, and may not account for diurnal swings in DO.
4. Evidence demonstrates that the Northshore waterbodies – and the Tchefuncte in particular – are not like the other waterbodies in the eastern LMRAP or the western LMRAP
    - Tulane/GRN argue that the Northshore waterbodies are significantly different from the remainder of the LMRAP, citing ambient DO data that show slightly higher DO values. As discussed above, ambient data does not give a complete analysis of the DO within a watershed. More stringent methods need to be used to establish criteria. LDEQ's work to revise and ground-truth the watershed subsegments established that the watershed subsegments belong in the LMRAP ecoregion, and where needed, subsegment borders were refined.
5. LDEQ's newly published draft integrated report for 2016 shows that a number of the Northshore waterbodies are meeting 5.0 mg/l
    - Northshore waterbodies are meeting 5.0 mg/L for ambient samples. While samples may reach higher DO values, the criterion being set is a minimum. The criterion is the tenth percentile of data collected during the critical period between 6 am and 12 pm, representing the minimum acceptable level of DO that could be possible. Again, ambient monitoring data is not as thorough as continuous monitoring, as explained in number 3, above. Higher DO levels occurring in a waterbody that is typically

characterized by low DO, as most of the waterbodies in the LMRAP ecoregion are, may indicate impacts of urbanization, hydromodification, and pollution.

6. EPA must disapprove LDEQ's application of the revised DO criterion to estuarine and tidally influenced waters.
    - The revised DO criterion applies only to inland streams. While these streams may be tidally influenced or connected to estuaries, this is in fact a characteristic of streams within the entire ecoregion. As such, the reference streams used and the findings of the eLMRAP UAA and the resulting DO criterion are appropriate.
    - Additionally, the state has adequately explained that the LMRAP ecoregion as a whole is a transitional zone, in which the landscape changes from the surrounding ecoregions. The extent of tidal influence is always being affected by rainfall and stream flow in freshwater systems and storm severity and cycles, resulting in a fluid state of salinity across the ecoregion.

Watershed Subsegments approved based on eLMRAP UAA

The eLMRAP UAA, as discussed above, demonstrated that the DO criterion established for streams in the western portion of the LMRAP as a result of the earlier western Barataria-Terrebonne (BT) UAA are appropriate for the eastern portion of the LMRAP. The DO criterion remains 5.0 mg/L (for inland areas) or 4.0 mg/L (for estuarine areas) for the months of December through February. The study used continuous monitoring of DO at six least impacted reference stream sites to compare to seven from the BTUAA. Physical and biological (fish) data were also collected. There were no significant differences in DO or physical and biological data found between the eastern and western portions of the LMRAP ecoregion, and as such LDEQ concluded that assigning the same criterion to seasonally affected streams was an appropriate action. EPA concurs with this finding in the eLMRAP UAA. As such, EPA approves the change to the following watershed subsegments without further investigation: 040201, 040303, 040305, 040306, 040401, 040402, 040403, 040404, 040503, 040506, 040508, 040601, 040604, 040605,

040606, 040702, 040705, 040809, 040907, 040915, 040916, 040917, 041101, 041201, 041202.

Watershed Subsegments approved after further investigation

Several subsegments required further investigation based on concerns raised by Tulane/GRN—Primarily those with portions outside of the ecoregion boundaries. These are subsegments 040807, 040808, 040903, 040912, 040913, and 040914. In addition to the changes in the DO criterion, LDEQ refined the boundaries of these (and all other) subsegments in the LMRAP ecoregion. This was accomplished by LDEQ through extensive ground-truthing which refined the boundaries to reflect the most current conditions. EPA R6 reviewed LDEQ's November 17, 2014 document "Explanation Of Subsegment Revisions In Lower Mississippi River Alluvial Plains, Southern Plains Terrace And Flatwoods, And Coastal Deltaic Marshes Ecoregions," finding that all modifications to ecoregion boundaries and watershed subsegments were scientifically based. The purpose of the refinements in most cases was to ensure that the subsegment boundary did not include waterbodies that drained into adjacent ecoregions. By excluding drainage from adjacent ecoregions, LDEQ established that the subsegments matched the characteristics of the LMRAP ecoregion. In the future, LDEQ likely will update the ecoregion boundary to include these subsegments. The following discussion provides the rationale for revisions to each subsegment boundary in question.

- For subsegments 040807 and 040808: These segments were originally one larger subsegment. Specifically subsegment 040807 was split to exclude drainage from the Southern Plains Terrace and Flatwoods (SPTF) ecoregion and the eastern boundary was adjusted to exclude Bogue Falaya River drainage. While a significant portion of subsegment 040807 lies outside the LMRAP boundary, that portion is ecologically similar to the remainder of the LMRAP ecoregion.
- Subsegment 040903: This subsegment did not undergo any boundary changes, but has a substantial area outside the current eLMRAP ecoregion boundary. LDEQ's evaluation places this subsegment within LMRAP, therefore the subsegment is ecologically similar to the LMRAP ecoregion, and thus the lower DO criteria is

applicable.

- Subsegment 0040912: this subsegment was split to exclude SPTF drainage and lies within the eLMRAP ecoregion boundaries.
- Subsegments 040913 and 040914: These subsegments were split to exclude drainage from the Coastal Deltaic Marshes (CDM) ecoregion, which lies to the south of the subsegments. Both subsegments have small portions which lie outside the current LMRAP ecoregion boundary.

EPA understands that as the landscape in and surrounding this ecoregion can change from year to year, due to both natural and anthropogenic causes, the ecoregion boundaries can shift in minor ways as well. Given the transitional nature of the eLMRAP ecoregion, its boundary will fluctuate with these changes in landscape. For subsegments that lie on or cross the ecoregion boundary, including subsegments 040506, 040702, 040706, 040807, 040903, 040907, 040912, 040913, and 040914, routine reevaluation of the ecoregion boundary and subsegment may be required.

EPA supports the boundary adjustments made to the watershed subsegments, and, while further revision may be needed in the future, does not believe that the subsegments with portions outside the current ecoregion boundary line show sufficient evidence to be excluded from the eLMRAP ecoregion. As such, EPA approves the revisions to DO criterion for these subsegments.

III. Literature Cited

LDEQ Water Permits Division, Explanation Of Subsegment Revisions In Lower Mississippi River Alluvial Plains, Southern Plains Terrace And Flatwoods, And Coastal Deltaic Marshes Ecoregions, November 17, 2014

LDEQ Water Permits Division, Use Attainability Analysis of Inland rivers and Streams in the Eastern Lower Mississippi River Alluvial Plains Ecoregion for Review of Dissolved Oxygen Water Quality Criteria, June 7, 2013.

LDEQ Water Quality Assessment Division, Use Attainability Analysis of Barataria and

Terrebonne Basins for Revision of Dissolved Oxygen Water Quality Criteria, May 9, 2008.

U.S. EPA and LDEQ, Memorandum Of Agreement: Establishment Of Ecoregion-Based Dissolved Oxygen Criteria And Assessment Methods, January 10, 2008.